MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2015/2016

TSE2101/TCS2411 – SOFTWARE ENGINEERING FUNDAMENTALS

(All Sections/Groups)

02 JUNE 2016
09:00 AM – 11:00 AM
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. The total number of pages for this examination paper is seven(7) pages including the cover page.

2. This examination paper contains a total of six(6) questions divided into two(2) different sections, Section A and Section B, respectively. Each section contains three(3) questions.

3. You are required to answer a total of four(4) questions. You must answer any two(2) questions from Section A and any two(2) questions from Section B.

4. Each question carries an equal score of 25 points. The total score for this examination paper is 100 points.

SECTION A

(Answer any two(2) questions in this section)

QUESTION A1

A1(a) Answer the following questions.

(a1) The Waterfall Process model in software engineering is considered the benchmark against which all other software process models are compared . Provide one(1) reason that supports this fact.

(a2) Describe any three(3) distinguishing characteristics of the Agile Process.

(a3) Software is virtual. Software is also some kind of instructions (codes) that when executed provide desired features, function and performance. If software is virtual (not actual or real), how can software execution produce actual and real function and performance? Please explain.

[3 x 3 points = 9 points]

A1(b) Software is constructed based on some requirements. Answer the following questions. You may use appropriate examples in your answers.

(b1) Provide three(3) reasons why software requirements must be documented.

(b2) One of the important principles for software testing is that "*All tests should be traceable to software requirements*". Discuss the significance of this principle.

[2 x 3 points = 6 points]

A1(c) Answer the following questions. You may provide examples in your answers.

(c1) What is the significance of critical path in project management?

(c2) Why is the task duration estimation difficult in project management?

(c3) Project management is about managing the 4Ps - "*People, Product, Process and Project*". Give an example of the consequences of not managing "People" correctly in a software project.

(c4) Discuss the principle of "*Use appropriate abstractions in software design*".

(c5) Explain why "*Build modular software*" is one of the important principles in software engineering.

[5 x 2 points = 10 points]

Continue ..

QUESTION A2

A2(a) Answer the following questions. You may provide appropriate examples in your answers.

(a1) Explain the difference between structural analyses and functional analyses when we conduct analyses of system and software requirements.

(a2) Describe the sequence of steps to identify some possible class operations (methods) starting from the analyses of system and software requirements.

(a3) Describe the following three(3) relationships of class constructs in object-oriented design.

(a3.1) Class Aggregation
(a3.2) Class Composition
(a3.3) Class Collaboration

[3 x 3 points = 9 points]

A2(b) Answer the following questions. You may provide examples in your answers.

(b1) Provide three(3) differences between a web application and a normal client-server application.

(b2) Explain the meaning of the two(2) terms, "a state-transition" and " an event", in the context of a software system that is represented as a state diagram.

[2 x 3 points = 6 points]

A2(c) Draw one(1) example diagram each that illustrates the following items as they are used in software engineering. You must label entities in your diagrams appropriately.

(c1) Activity Diagram
(c2) Swim Lane Diagram
(c3) Context diagram
(c4) Data Flow Diagram
(c5) Entity Relationship Diagram

[5 x 2 points = 10 points]

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QUESTION A3

A3(a) Answer the following question. The design for a system must satisfy explicit, implicit and emergent requirements. Explain the meaning of the three(3) terms below. You may provide appropriate examples in your answers.

(a1) explicit requirement
(a2) implicit requirement
(a3) emergent requirement

[3 x 3 points = 9 points]

A3(b) Answer the following questions. You may provide appropriate examples in your answers.

(b1) What is the "monolithic design" architecture for a software system.

(b2) Explain the three(3) characteristics or parameters that define a platform-based design architecture.

[2 x 3 points = 6 points]

A3(c) Discuss what each of the following five(5) statement means.

(c1) The Linux kernel software is not modular.

(c2) The *BitTorrent* application follows the peer-to-peer design architecture.

(c3) Most payment gateway applications for internet shopping portals implement the Service Oriented Architecture (SOA).

(c4) Every Android software application is based on the multi-tiered design architecture.

(c5) The *CAMSYS (Campus System)* application at Multimedia University is implemented based on the data-centric design architecture.

[5 x 2 points = 10 points]

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SECTION B

(Answer any two(2) questions in this section)

QUESTION B1

B1(a) Describe one specific and concrete activity (what to do exactly) for each of the following practice in order to achieve good user interface design. You may provide examples in your answers.

(a1) Place the user in control
(a2) Reduce the user's memory load
(a3) Make the user interface consistent

[3 x 3 points = 9 points]

B1(b) Answer the following questions. You may provide examples in your answers.

(b1) Describe the difference between cohesion and coupling in the context of object-oriented software design.

(b2) The design of software for an information system (data-centric focus) is different from the design of software for controlling a domestic washing machine (control and event-handling focus). Describe three(3) example tasks that must be handled in the software for controlling the domestic washing machine.

[2 x 3 points = 6 points]

B1(c) Discuss the following five(5) characteristics of true software components in the context of Computer Based Software Engineering (CBSE). It means you must explain what these characteristics mean in the implementation of true software components.

(c1) Standardized
(c2) Independent
(c3) Modular
(c4) Composable
(c5) Documented

[5 x 2 points = 10 points]

Continue ..

QUESTION B2

B2(a) Answer the following questions. You may provide examples in your answers.

(a1) Describe one(1) difference between Software Quality Control (SQC) and Software Quality Assurance (SQA).

(a2) Discuss the following three(3) characteristics of software quality.

(a2.1) Usability quality
(a2.2) Reliability quality
(a2.3) Robustness quality

(a3) List any three(3) requirement clauses (topics) required in the ISO 9001-2000 quality assurance standard.

[3 x 3 points = 9 points]

B2(b) Answer the following questions. You may provide examples in your answers.

(b1) What is the difference between "*product quality*" and "*process quality*"?

(b2) What does the phrase "*software quality dilemma*" mean?

[2 x 3 points = 6 points]

B2(c) Discuss the following software testing strategies. You may discuss the methods involved, the different focus, or the effectiveness of the strategies.

(c1) testing at the component level
(c2) principle of "testing-in-the-small"
(c3) use of independent test groups
(c4) white-box versus black-box testing
(c5) use of regression testing

[5 x 2 points = 10 points]

Continue ..

QUESTION B3

B3(a) Answer the following questions regarding monitoring and control in a software project. This question is about managing a project. Each description should be less than 100 words.

(a1) Describe one(1) activity in a software project that needs to be controlled. Explain why control of the activity is required.

(a2) Describe one(1) activity in a software project that may create problems. What are the possible negative consequences of the activity?

(a3) Explain the differences between the following three(3) concepts: *the risk of an event, the probability of the event, and the impacts of the event.* How are the concepts related?

[3 x 3 points = 9 points]

B3(b) Answer the following questions. You may provide suitable examples in your answers.

(b1) Give one(1) example of a CASE (Computer Aided Software Engineering) tool for each of the following software engineering activities.

(b1.1) Software Project Management to generate the Gantt Chart implementation schedule.

(b1.2) Software Construction to generate codes using the Java programming language.

(b1.3) Software Design to generate UML design diagrams.

(b2) In Software Configuration Management (SCM) we must have a software baseline. Explain why this baseline is mandatory.

[2 x 3 points = 6 points]

B3(c) Discuss the following issues regarding object-oriented software testing. You may discuss the methods involved, the different focus, the associated problems, or the advantages or disadvantages.

(c1) unit testing involving classes
(c2) states testing involving classes
(c3) validation testing involving classes
(c4) random testing in object-oriented design
(c5) integration testing in object-oriented design

[5 x 2 points = 10 points]

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